

**ABSTRACT**

A catheter that is particularly useful for simultaneously mapping multiple points within the heart is provided. The catheter includes a mapping assembly including a plurality of flexible spines, each having a free distal end. The spines are supported by an improved support structure that permits the spines to be more precisely arranged relative to one another. The catheter comprises an elongated catheter body. A mapping assembly is provided at the distal end of the catheter body. The mapping assembly comprises a support structure having a generally cylindrical base mounted on the distal end of the catheter body, the base having proximal and distal ends. The support structure further comprises at least two pre-shaped flexible support arms. Each support arm has a proximal end attached to the distal end of the generally cylindrical base and a free distal end. At least two non-conductive coverings are provided, each in surrounding relation to a corresponding one of the at least two support arms. At least one electrode is mounted over each of the at least two non-conductive coverings.

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